II

THE EARLY YEARS, 1943-1952

When the Japanese attacked Pearl Harbor in December 1941, the United States was hardly prepared to fight a world war with two major fronts separated by thousands of miles. The Axis powers had been on the offensive successfully for months, even years, in the Far East. Among the major powers, only Britain, and belatedly Russia, remained in the war on the Allied side. Opening two major theaters of operations against the advancing Axis alliance created grave difficulties, even for a nation as rich in manpower and resources as the United States. Because the United States had made only minimal preparations for the outbreak of war, the difficult task of mobilizing men and materiel and allocating them to two widely separated fronts created problems not only within the American government, but among the Allied powers as well. Once the American mobilization began, significant problems in allocating men and resources remained. These difficulties ranged from the great debates among Roosevelt, Churchill, and Stalin over opening the second front in Europe to less dramatic problems of apportioning the finite American resources between the European and Pacific theaters of operations.

By 1943 the scope of American military operations had expanded so much that the Joint Chiefs of Staff (JCS) felt the need for more careful and comprehensive planning in the use of manpower and materiel.[1] The military staffs in Washington not only had to anticipate the future requirements of each theater, but they also had to reconcile the requirements of one theater with the needs of the others. Thus, in 1943, the JCS ordered the Army and Navy to establish planning staffs in Washington that would make their own projections of each theater's needs and then assist in reviewing the plans of each theater as they were submitted.

In response to this order, the Chief of Engineers established the Plans Section within the Theater Branch of the War Plans Division (see figure 11). Although the Plans Section should have been concerned with all the theaters of operations, most of its attention focused on the Pacific. The Allied headquarters in Europe already included many planners, and the preparations for the invasion of Normandy had already been worked out in great detail. Thus the Plans Section conducted only a cursory review of the Engineer requirements for operation OVERLOAD. The Pacific theater, however, had fewer planners, and information about the area was much

WAR PLANS DIVISION

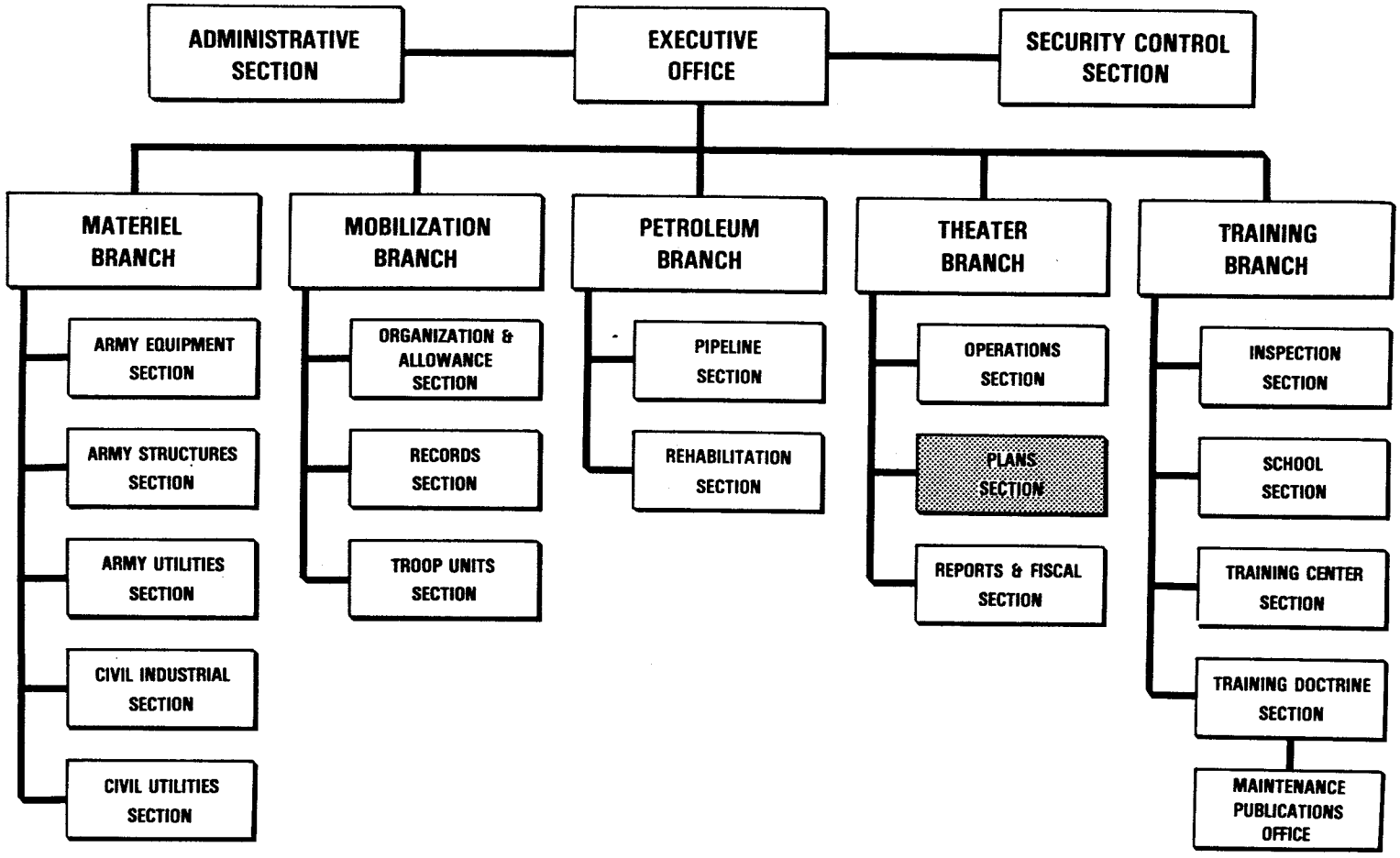

Figure 11

sketchier than it was for Europe. In addition, the military situation in the Pacific was much more fluid. Planning staffs in the theater strained to keep up with daily developments and could not plan sufficiently for future operations. As a result, the Plans Section concentrated on the Pacific islands campaigns and the China-Burma-India theater.

The Plans Section began operations in the summer of 1943 with very little information on which to base estimates of the manpower and materiel required to accomplish the military construction that the theaters needed. Established planning procedures for construction were lacking and the stockpiles of construction materiels were small. The Army's inadequate supply catalogues forced planners to rely on catalogues from hardware companies. Most of the available designs for theater facilities derived from the experiences of the American Army in France during World War I. Although construction equipment had changed considerably during the decade prior to the war, much of the information about its capabilities came from manufacturers' sales brochures. All of these factors made it difficult for planners to estimate the facilities that a theater needed and the amount of time, manpower, equipment, and materiel required to build them. For the last two years of the war, the Plans Section concentrated on these questions.

The group's first assignment was to estimate the construction schedule and capacity of a road that the Army planned to build from India through Burma into China.[2] Although the Army staff had already allocated Engineer units for the project, it was not sure how long the work would take. Adequate information about the terrain in Burma was available only because an enterprising theater Engineer had traveled the length of the 900-mile projected route in a jeep. The section obtained data on how much construction work Engineer units could perform in a given time from a general who commanded Engineer units working on the Alcan highway. A series of articles in an engineering publication provided valuable information on the construction problems involved in building the Pan-American highway. With these miscellaneous pieces of data and their own experience, the planners in the section developed a projected construction schedule for the Ledo-Burma Road. After the completion of the road, a comparison of three staff estimates and the actual construction schedule demonstrated that the Plans Section's estimates had been remarkably accurate.

Following its first project, the section worked on a series of Base Development Plans and Bases and Phases Studies for Engineer involvement in the "island-hopping" campaigns in the Pacific. These base studies evaluated the potential of captured islands as logistical support centers for further American military operations aimed at the remaining Japanese-held territories. Because the strategic operational decisions about which islands to attack often relied on the adequacy of the captured islands as bases for future operations, these logistical studies influenced overall planning of the

Pacific campaign. Working closely with the other technical services, the Plans Section prepared studies or study annexes on various Pacific islands for the Army Service Forces, the Joint Logistics Plans Committee (JLPC), and the Joint Chiefs of Staff. From its inception, the Plans Section, although devoted to matters of Engineer interest, produced its studies for agencies outside the Corps of Engineers.

Although the Plans Section often worked with sketchy information and background materials in response to a rapidly changing military situation, it tried to systematize and standardize its procedures. As its experience grew, the section distributed an informal series of guidelines called Engineer Planning Factors, which attempted to establish construction requirements for logistical facilities, including the manpower and materiel needs. As the planners developed these factors, they sent them to theater Engineers. Later the factors became the basis for a field manual and the Engineer Functional Components System (EFCS). In addition, the section also established a standardized format for its studies that served as a basis for the Engineer Strategic Logistic Studies, and later the Department of the Army Strategic Logistic Studies.

At the close of World War II, the United States rapidly demobilized. In the haste and confusion of this demobilization, several Engineer planners feared that the logistical planning ability and talent that had been built up during the war would be lost. Lieutenant Colonel Robert A. Lewis, Captain L. H. Todd, and others persuaded the Joint Logistics Plans Committee to ask the Chief of Engineers to maintain some sort of planning agency in his office. In response, the Chief of Engineers established the Planning Branch, which was composed of retired military personnel, most of whom had served in the Plans Section or in one of its companion agencies in the War Plans Division. For two years, this small group of eight men moved from building to building and agency to agency.[3]

In July 1947 the Planning Branch, later called the Strategic Planning Section (SPS), was attached to the Army Map Service (AMS) in Brookmont, Maryland. Although transferred to AMS to avoid postwar restrictions on the overall size of the Army General Staff, the move had important implications for the section's future. Also located with AMS were extensive Engineer intelligence operations, which remained there until the unification of military intelligence activities in the Defense Intelligence Agency.[4] The convenient access to this intelligence information and the mapping facilities of AMS were significant in the Strategic Planning Branch's expansion into new fields of activity.

In the late 1940s the section still worked primarily in Engineer logistics planning. The letter from the Chief of Engineers transferring the Planning Branch to AMS gave it full responsibility for "the preparation of engineer logistics studies of strategic areas, lines of communication, and present and potential bases for operations as directed by the Joint Logistics

Plans Committee (JLPC), JCS, and the War Department General Staff."[5] Its responsibilities also included "the preparation of the engineer portion of War Department prepared projects" and "the edit and review of theater prepared operational projects."[6] All of these "logistics studies" were in essence continuations of the wartime activities of the Planning Section, which had not only drawn up logistics plans at the direction of the JLPC but had also reviewed theater Engineers' plans.

The letter from the Chief of Engineers emphasized one particular aspect of this Engineer logistics planning. The Planning Branch was to assume "full responsibility" for "the interpretation of War Department overseas construction policies and the determination of the type of Engineer Class IV items required for implementation thereof."[7] The Statement of Functions from 1949 amplified this task by including the requirement that the section "include a Bill of Materials covering the phase requirements for Engineer items of supply" as a part of the "Engineer Annex to the Department of the Army Prepared Projects."[8] These responsibilities outlined in the functional statements of the late 1940s were the foundations for two important Planning Branch activities in the following decade—the Department of the Army Strategic Logistic Studies and the Engineer Functional Components System.

The letter transferring the Planning Branch to AMS confirmed another important characteristic of the organization. The branch was to prepare the Engineer logistics studies at the direction of the JLPC and the War Department (after 1947, the Department of the Army) General Staff and "for the efficient performance of your mission, you are authorized direct liaison with the several divisions of the War Department General Staff."[9] Thus, from its beginning, the SPS had open lines of communication with the entire Army General Staff.

Its access to the Army staff and its almost fortuitous location at AMS helped to shape the nature of the organization. As a staff agency located physically close to the rest of the staff, the SPS might well have become submerged in the day-to-day pressures of routine operations. Located several miles from the Office, Chief of Engineers (OCE) and organizationally detached from the staff, the section had the leeway to evolve into a think tank removed from daily operational concerns and able to devote its energies to long-term planning and study. In addition, its access to the Army staff beyond OCE provided the avenue for expanding its concerns to Army and defense issues in general. From these foundations established in the 1940s, the Strategic Planning Section evolved during the 1950s into a study organization that was always involved with Engineer concerns but had the opportunity to expand beyond these into issues of broader military significance.

In the late 1940s, this broadening of SPS's concerns lay in the future, and most of its activities related to matters of Engineer logistical

planning. Although the problem of supplying a military force in the field was as old as war itself, it still caused enormous difficulties that had only become more intractable with the massive growth in the size of armies and the number of supplies they required.[10] American participation in World War II had involved a number of complicated amphibious operations, including the massive landing in Normandy, and logistical problems had bedeviled many of these. "We knew," ESC analyst Robert Bockting recalled, "that in World War II we either had too much or too little of everything or it was either late or early."[11] Because few logistical planning procedures existed prior to the war, the American Army had been forced to improvise, depending on the vast resources of the United States to turn the tide.[12] Interest in retaining the experience gained during the war and developing more formalized procedures had been major reasons for preserving the Planning Section. One type of wartime ad hoc planning format was preserved and formalized in the Department of the Army Strategic Logistic Studies (DA-SLs).

The DA-SLs were complex, highly detailed plans that attempted to predict all of the supplies and manpower that would be needed to conduct a military campaign in a given geographic region over a specified period of time: "A DA-SL study [sic] develops a plan for logistic support of a given campaign plan, measures the logistic costs in manpower and materiel, and identifies situations and problems which are likely to arise in support of the campaign."[13] Based on an analysis of the international situation, the Deputy Chief of Staff for Operations (DCSOPS) drew up a campaign plan for the use of American troops in a particular area, and this operational plan served as the basis for a logistics plan to support that campaign. Although the Deputy Chief of Staff for Logistics (DCSLOG) had overall responsibility for the support plan, each technical service contributed an annex that outlined the troops and supplies needed for its role in the campaign. The Strategic Planning Section drew up the annex for the Corps of Engineers.

The preparation of each annex was a complicated and laborious task that was performed by hand until the 1960s. Because each annex was tailored to a specific region, time, and set of assumptions, such as the support that allied forces would provide, a large number of variables needed to be considered: "These annexes give consideration to the climate and geographic conditions; indigenous economy and the resources of the area; destruction by the enemy and our own forces; rate of build-up of troop population and the tactical situation."[14] Because the Corps of Engineers did most of the construction work for the other technical and administrative services, the Engineer annex involved coordination and consideration of their requirements. The tasks ranged from rehabilitation and construction of ports, roads, railroads, bridges, airfields, barracks, and hospitals to water supply, map supply, camouflage, tents, and snow removal. Based on

experience and judgment, the planners projected the time, materiel, and numbers of Engineer troops needed to provide the facilities and services required at each stage of the operation. After making all these calculations, the Strategic Planning Section determined the feasibility of the proposed operation from the Engineer standpoint. Taken together, the technical services' annexes and the entire logistics plan tested the Army's capability to conduct military operations and guided future Army planning and budgeting.[15] In the tense postwar world, it was presumed that the Army would need more careful planning than had previously been the case.

Meticulous and detailed planning, like that involved in the DA-SLs, was time-consuming and cumbersome. Although the supply catalogues that the Planning Section had lacked were developed after World War II, little had been done to improve the most difficult phases of the planning process—the phases that involved "the thorough determination of needs; the preparation of bills of material; and the review by the Army and the JCS."[16] Not only did planners have to determine the facilities required by a campaign, they also had to select construction materiel from 30,000 to 40,000 items in the supply system. After these calculations had been made, a higher staff agency undertook a time-consuming review of the original plans before the materiel could be shipped. Even in peacetime the system was clumsy, but in war it could be disastrous.

The Joint Logistics Plans Committee appointed an ad hoc subcommittee to study this problem in May 1951 and the subcommittee recommended that the Corps of Engineers establish a system of "functional components."[17] The term was borrowed from the Navy, which during World War II had developed a system of naval base planning in which each function on a base was defined in terms of the men and materiel needed to provide the required facilities and to perform the specified function. As adopted by the Corps of Engineers, the term "functional component" had a more restricted meaning: "It is a statement of the Class IV materiel and manpower required to provide facilities needed to carry out a function."[18] In the 1950s, there were two categories of Engineer supplies—Class II and Class IV. Class II, which included supplies and equipment assigned to each unit by official allowances (e.g., Tables of Organization and Equipment and Tables of Basic Allowances), contained "the minimum items with which a unit can perform a normal task under normal conditions and still retain the desired mobility."[19] In contrast, Class IV supplies and equipment (excluding Air Force supplies) were those that were not officially prescribed. For the planner, Class IV supplies were the largest concern because they depended on the nature of the operation, the climate, terrain, indigenous resources, the transportation facilities, and other factors peculiar to the given geographic location of a projected operation. Consequently, Class IV materials, which accounted for approximately 80 percent of the Engineer supplies going into a theater, were difficult to

estimate.[20] Establishing a system that could simplify and expedite this aspect of Engineer planning was clearly a major concern.

Although the Chief of Engineers assigned responsibility to several agencies, for instituting the EFCS, he directed the Strategic Planning Section to design the system and supervise its implementation. In his report to the Chief of Engineers, an Assistant Chief of Engineers summarized the basic purpose of the system: "Briefly, the objective of this planning system is to provide balanced bills of material for the construction of the many combinations of facilities required for the support of military operations and to provide a means whereby these bills of material can be prepared mechanically."[21] When a planner needed a standard facility for a military operation, such as a 500-bed hospital or housing for 1,000 troops, he could simply specify that facility or component, if it was included in EFCS, and obtain a prepared bill of materials. This bill of materials would specify the quantity and type of Class IV construction material, from the smallest nail to the largest beam, and the time needed for a certain number of Engineer troops to construct the facility. Combining the bills of materiel would then provide a master list of the construction supplies required for an operation and avoid the problems of World War II, when overstocking some items and understocking others severely hampered construction. In addition, the new system would greatly expedite planning and avoid the mistakes and idiosyncrasies that showed up in calculations by individual planners. Moreover, the use of mechanical procedures would hasten the review process performed by higher staff levels.[22]

In its initial study proposing the system, the SPS defined the following purposes for the EFCS:

1. Facilitate the preparation of estimates of Class IV materiel and troops required to support project military operations.
2. Improve and expedite review of logistic support plans submitted by overseas commanders.
3. Assist engineer planners in overseas commands in preparation of estimates of requirements.
4. Aid in achieving balance between items of supply in procurement program and overseas stockage.[23]

SPS considered the EFCS as a planning tool that represented the first step toward standardizing joint supply procedures. In its original form, the system was primarily a planning tool: "To the Engineer planner, 'functional components' are not sets or assemblies, as such, but are a convenient means of bringing together bills of material."[24] In 1951 the SPS began to design the system, specify the facilities or components, and supervise the work of contractors who prepared the detailed designs and bills of materials. The initial estimates called for completion of the system in 18

months, but the SPS was to work on the EFCS for more than a decade.[25] The task turned out to be much more complicated and time-consuming than expected.

From 1943 until 1950, ESC's predecessors focused almost entirely on Engineer logistical planning, such as base development and DA-SLs. In 1950, however, a major new area of inquiry took the SPS and its successors well beyond logistical matters and thrust the organization into close contact with high staff and departmental levels. This new field of study was atomic weapons.

In the closing weeks of World War II, a new and enormously destructive weapon devastated two Japanese cities, ushering in the age of nuclear warfare. Although the development of the atomic bomb heralded a new age of warfare, the dramatic effects were scarcely felt in the last half of the 1940s. The new weapons were so bulky and unwieldy that they were difficult for the short-range aircraft of the period to deliver, and they were so difficult and expensive to produce that they did not seem to be the "absolute" or decisive weapons that some had envisioned. Thus, even though the United States had a monopoly on nuclear weapons in the late 1940s, American military planners continued to anticipate that the next war would be like the last one, except that the enemy would be the Soviet Union and the atomic bomb would be simply another, albeit much more powerful, weapon of strategic bombing.[26]

In 1949 this vision of future wars was shaken when the Russians exploded their first atomic weapon and ended the American nuclear monopoly. As the wartime aura of East-West cooperation gradually faded, the United States found itself faced with a hostile and aggressive competitor in a new era of conflict. In 1950 the aggressive tendencies of communism seemed to be confirmed when North Korea attacked South Korea. For many American leaders, the attack on South Korea presaged the beginning of a major communist offensive that threatened to engulf the Free World.

The war in Korea intensified the atmosphere of crisis and confrontation in the United States, and this mood of tension soon affected the SPS. As Major General George Rebh, once an SPS planner, recalled, "General Lawton Collins, who was the Chief of Staff of the Army, confronted with the situation in the Far East, asked what we would do if the Russians did the same thing (in Europe). How could we use atomic weapons in a tactical sense, in land employment in support of the ground troops?"[27] The Pentagon feared that the attack on Korea was simply a diversion for a major offensive against Western Europe. Since the rapid demobilization of American forces after World War II, the United States and its European allies had been decidedly inferior in ground forces to the Soviet Union. However, some military experts felt that American nuclear superiority could offset the numerical advantage of the Soviet Union.

Because the atomic bombs of the late 1940s had been so unwieldy

and few in number, little thought had been devoted to their use on the battlefield. As late as 1950, the only nuclear weapon stockpiled in even modest numbers was the 20-kiloton bomb, which was roughly the size of the ones dropped on Japan.[28] During the early 1950s, however, major innovations in atomic weapons technology made lighter, smaller, and less powerful weapons possible. As the weapons became smaller in yield and size, they could be put in artillery shells, placed on the early missiles, used as land mines or atomic demolition munitions (ADMs), or dropped from tactical aircraft with less danger that they would harm friendly forces.[29] This revolution in technology made possible the tactical use of atomic devices on the battlefield.

Because prior to 1950 nuclear weapons had been largely the concern of the Air Force in its strategic mission, the Army had very little current expertise on the subject. Thus, when the Chief of Staff of the Army sought officers to study the new uses of atomic power, he turned naturally to the first group of military men who had had close contact with nuclear technology. According to Rebh, "He went to the Chief of Engineers' office and asked them if they had anybody who had been with the Manhattan Project which had developed the atomic bomb. They came up with a list of names and I gather my name was on it. I had been an aide to General Groves from 1946 to 1947."[30] Major General Leslie Groves was an Engineer officer who had headed the Manhattan Project, and General Rebh, then a major, had not only served with him, but also in the Armed Forces Special Weapons Project. In 1950 Major Rebh was chosen to establish a new subdivision in the SPS devoted to nuclear weapons: "What they were interested in was somebody who was familiar with the language and the effects of atomic weapons."[31] As his assistants, Major Rebh chose two Engineer captains, William Barnes and Kenneth Paape, who had attended the courses on nuclear weapons offered at Sandia. Together they formed the unit that began the SPS's studies of nuclear weapons.[32]

The initial difficulties that faced the SPS's nuclear weapons unit recalled the first problems that confronted the plans sections during World War II. Both groups had to begin their work with the most basic questions. "Since we were going to start analyzing the use of atomic weapons," Rebh said, "the first thing we had to do was to develop some tools with which we would analyze targets. I never conceived it as our role to develop these tools but rather to be the users of tools. But there were no tools in existence, so that our first job was to develop them."[33] These tools were a series of charts that allowed an officer, after locating a target and determining the degree of damage desired, to specify quickly what size of atomic weapon should be used and at what height it should be exploded: "I think what we came up with was the first set of tools which one could use to assess damage and in the selection of targets."[34] After developing these guidelines, the SPS went on to its central objective: the selection of likely targets for tactical atomic strikes.

It was in this process of selecting targets that the SPS began another major area of study that continued to the present day: the area of barrier and denial planning. Although this type of planning grew out of the section's concern with tactical nuclear weapons, it was clearly an Engineer matter, as the definitions of the concepts indicate: "Barrier operations are that part of tactical operations which is concerned with the coordinated employment of natural and artificial obstacles to canalize, divert, restrict, delay or stop an opposing force, and assist in inflicting additional losses on the enemy by enhancing the fire of weapons systems."[35] Denial operations involve "the planned prevention or hindering of enemy occupation and utilization of areas, supplies, equipment or facilities of strategic military value."[36] Thus the two operations were logical complements: "Barriers block an enemy from moving into an area, whereas denial operations, by acting upon his logistics 'tail,' prevent him from readily moving beyond the area he has occupied."[37]

Both barrier and denial planning and the use of tactical atomic weapons developed in response to one central assumption in postwar American military thinking—that Soviet or Warsaw Pact forces would have numerical superiority in the next war. As Robert Bockting pointed out:

> Early after World War II there was really no thought of forward defense in Europe. We knew our ground forces were much inferior to the Russians and should they attack, our response would have to be with atomic weapons. But since very early on we did not have the small ones, we knew that they would have to be used sparingly. Major Rebh formulated a plan by which we might be able with inferior forces to hold well forward in Germany by the use of barriers to augment our own firepower.[38]

Because the early tactical atomic weapons were so powerful and scarce, the planners felt they would have to be used against large and important targets. Thus, the barriers were designed to block the main invasion routes into Germany and thereby create large concentrations of enemy troops and equipment that would make using atomic weapons worthwhile. According to Rebh, "The primary purpose was atomic weapons, but at the same time we thought we would get better use, more remunerative use of atomic weapons if we had the barriers in place."[39] Thus barrier planning and tactical atomic weapons planning emerged in the SPS from the same set of military problems.

The first series of barrier plans, drawn up for Europe, contained three alternative models for three different defense strategies. The first model called for American withdrawal to the Rhine River, which would then be the primary barrier. Forward of the Rhine, American troops would only attempt to retard the Russian advance. The second model assumed that substantial numbers of American troops would be available and thus the best possible lines near the German-Warsaw Pact borders would be held in a

"deliberative defense." Between these two extremes of the weakest and strongest American response was the third model, which placed the line of barriers somewhere between the Rhine and the Iron Curtain. Forward of that line the defense would be "retardation" and behind it, "deliberative."[40] This technique for solving a problem became a common one in SPS studies. The analysts would define possible solutions to the two extreme cases of a problem even though neither might be highly likely and, given the knowledge of these extremes, devise an intermediate and often more feasible solution.

During the early 1950s, four major barrier studies for the American Army in Europe examined the Fulda/Hessian gap, the Meningen gap, the Black Forest, and the upper Danube.[41] At the request of North Atlantic Treaty Organization (NATO) headquarters, the SPS also worked with the British on a plan for their sector in northern Germany. Major Rebh visited Yugoslavia unofficially to survey the terrain for the final European study of the Ljubljana gap in the northern part of that country: "As a result of this project, what we did was a terrain study, an analysis of the use of barriers and obstacles from the Baltic Sea to the Adriatic."[42] In addition to the European studies, the SPS also assessed the use of barriers in the Korean peninsula and in Indochina during the period when the French were besieged at Dien Bien Phu. By 1954, when Major Rebh left, SPS had already developed considerable experience in barrier planning.[43]

Thorough examination of the physical characteristics of an area was fundamentally important in these barrier studies. In each study a "terrain analysis" examined the topography, climate, vegetation, soil conditions, drainage systems, and any other physical features that might be used or adapted for defensive positions. Using these existing features, the studies then outlined the obstacles that could be imposed in front of the enemy either by building or tearing down manmade features. Bridges, roads, railroads, and tunnels could be destroyed or embankments, ditches, minefields, barbed wire, and abatis could be thrown across the line of the enemy advance. At points where these obstacles promised to delay large numbers of enemy troops and equipment, the plans called for detonation of atomic weapons. The studies not only outlined valuable defensive terrain features, but they also estimated the requirements of troops and materiel for constructing the barrier system.[44]

When Major Rebh or his staff explained these plans in Europe, they always pointed out that the studies were skeletons, frameworks that local commanders could use as guidelines and adapt as the immediate circumstances dictated: "We were doing the work for them that they should have been doing themselves but did not have the resources or the time to do. Our approach was that we are not telling you what to do. All we are doing is giving you this information. Use it as you see fit."[45] Because the civilian planners at SPS could devote their full efforts to the studies and were not

rotated from job to job like the officers, they could develop the expertise and experience that might be lacking in the field. Their location at AMS was also a valuable asset; the planners had easy access to the mapping facilities and the Engineer intelligence that were necessary for comprehensive terrain analysis. As a supplement to the map study, SPS analysts visited the locales of the studies in Europe, surveying them from the ground and the air.[46] Yet in spite of the careful effort that went into the studies, Major Rebh and his staff wanted to avoid giving the impression that the barrier studies represented the revealed and immutable gospel, as in the case of the inflexible and brittle Maginot Line that had lulled and then deceived the French.

In addition to the barrier studies for Europe, the section also did several denial studies that outlined ways in which American forces could prevent valuable facilities in Germany from falling into the hands of advancing Soviet armies. One such study planned the destruction of electrical generating capacity in the area evacuated by American troops, and another called for the destruction of the stockpiles of petroleum products in Germany, ranging from oil storage depots to individual gasoline stations.[47] By the early 1950s the foundations of the SPS expertise in both barrier and denial planning were established.

From 1943 to 1953 SPS expanded its size and its interests. All of these concerns, however, related to its initial involvement with Engineer logistics and construction. From its early, ad hoc, and often improvised studies of logistics in the Pacific campaigns came its role in preparing the Department of the Army Strategic Logistic Studies. The continuing preoccupation with solving the massive logistics problems that had appeared during World War II led to the DA-SLs and the Engineer Functional Components System that attempted to simplify and expedite the DA-SL planning process. Although a new concern, tactical atomic weapons, helped spark barrier and denial planning, this planning itself became an integral part of the Engineer effort in a campaign, and as such became one aspect of DA-SL planning. But while SPS grew on a foundation of Engineer logistics planning, the field of atomic weapons became its entree into operational planning, first on the battlefield with barriers and tactical atomic weapons, then in the next few years with strategic nuclear warfare itself. None of this evolutionary process was planned in advance. It grew out of the interaction of the organization, its initial concerns, and the changing military circumstances of the postwar world.

Like the Army, SPS spent much of the seven years after World War II preoccupied with problems that the war had demonstrated or highlighted. The outbreak of war in Korea showed that these important problems still needed solutions. While the Korean War was fought much like World War II, it served to dramatize the new era of "Cold War" between two emergent superpowers. Although nuclear weapons were not used in Korea, the last years of the Truman administration saw a revolution in the atomic field—a

revolution that made nuclear weapons more powerful, more plentiful, more versatile, and available now to both the United States and the Soviet Union. It was during this same period that SPS first became concerned with nuclear weapons. From these tentative beginnings in the early 1950s, the United States after 1952 entered a period of great preoccupation with atomic weapons. As the Army struggled to find its niche in the new nuclear world, SPS was thrust further into the vortex of nuclear strategy and planning.

Notes for Chapter II

1. The account of the origins and activities of the Strategic Planning Section (SPS) is based largely on information supplied by Lazarus H. Todd, who was an officer in the Planning Branch and then an analyst with its successors until 1957. The information came from an interview with Mr. Todd on 3 March 1981, a manuscript history of SPS written by Mr. Todd, and a collection of his papers. Only a few ESC studies for the period prior to 1955 were available. The current ESC *Bibliography* begins in 1955, and the ESC records at the Washington National Records Center (WNRC) and at the center include no studies for the years before 1955. Research at the National Archives, the WNRC, and the National Personnel Records Center (NPRC) in St. Louis, Missouri, failed to uncover any earlier work. Apparently, the pre-1955 records were stored in the NPRC and were destroyed by a fire in 1973. As a result, chapter II and parts of chapter III are based largely on interviews and Mr. Todd's collection of papers.

2. For background information on the Ledo-Burma Road, see James A. Huston, *The Sinews of War: Army Logistics, 1775–1953* (Washington, DC: Government Printing Office, 1966), p. 545; and Karl C. Dodd, *The Corps of Engineers: The War Against Japan* (Washington, DC: Government Printing Office, 1966), pp. 405–406, 409–410, and 412.

3. Letter from the Chief of Engineers (COE) to the Commanding Officer, Army Map Service (AMS), 30 June 1947, ESC Historical Files.

4. Interviews with Lazarus H. Todd, Washington, DC, 3 Mar. 1981; and Maj. Gen. George Rebh, USA (Ret.), Washington, DC, 10 Mar. 1981. See also James E. Hewes, Jr., *From Root to McNamara: Army Organization and Administration, 1900–1963* (Washington, DC: Government Printing Office, 1975), p. 311.

5. Letter from COE to Commanding Officer, AMS, 30 June 1947.

6. Ibid.

7. Ibid.

8. Organization Charts 1949–1950 and Statements of Functions 1949, AMS, USACE, Records of U.S. Army Major Commands, Record Group 338 (hereafter cited as RG 338), WNRC, Suitland, MD.

9. Letter from COE to Commanding Officer, AMS, 30 June 1947.

10. For general surveys of the history of logistics, see Martin L. Van Creveld, *Supplying War* (New York: Cambridge Univ. Press, 1977); and Huston, *Sinews of War.*

11. Interview with Robert B. Bockting, Washington, DC, 5 Feb. 1981.

12. L.H. Todd, "Draft Study and Proposed Program for Development and Maintenance of the EFCS," 3 Jan. 1968, pp. 2–3, Todd papers.

13. L.H. Todd, "War Gaming and Simulations in Military Planning," May 1962, p. 2, Todd papers.

14. L.H. Todd, "Department of the Army Strategic Logistic Studies (DA-SLs)," Plans Division, DCSLOG, July 1960, p. 5, Todd papers.

15. Ibid.

16. Military Plans Division (MPD), *Computing Engineer Requirements by Use of Functional Components*, May 1951. This document, found in the collection of L.H. Todd's papers, is one of the few SPS studies available for this period.

17. "Report by the Ad Hoc Subcommittee to the Joint Logistics Plans Committee on Man-Hour Factors and Common Tasks of New Construction and Other Engineering Effort," LPGM 456, 9 May 1951, ESC Historical Files.

18. MPD, *Computing Engineer Requirements by Use of Functional Components*, p. 1.

19. Ibid., p. A-1.

20. Ibid., p. 1.

21. Letter from the Assistant Chief of Engineers for Military Operations to COE, 11 Sept. 1951, ESC Historical Files.

22. Richard W. O'Neal, "Slipshod Slipstick or Functional Components," *Army* 8 (Aug. 1957): 47–50.

23. MPD, *Computing Engineer Requirements by Use of Functional Components*, p. i.

24. Ibid., p. A-5.

25. Letter from the Assistant Chief of Engineers for Military Operations to COE, 11 Sept. 1951, ESC Historical Files.

26. Bernard Brodie, ed., *The Absolute Weapon: Atomic Power and World Order* (New York: Harcourt, Brace and Co., 1946); and Harry R. Borowski, "Air Force Atomic Capability from V-J Day to the Berlin Blockade—Potential or Real?" *Military Affairs* 44 (Oct. 1980): 105–110.

27. Interview with Gen. Rebh.

28. Interviews with Gen. Rebh and Mr. Bockting; and David Alan Rosenberg, "American Atomic Strategy and the Hydrogen Bomb Decision," *Journal of American History* 66 (June 1979): 81.

29. For the development of tactical nuclear weapons, see Michael Mandelbaum, *The Nuclear Question: The United States and Nuclear Weapons, 1946–1976* (New York: Cambridge Univ. Press, 1979), pp. 100–105.

30. Interview with Gen. Rebh.

31. Ibid.

32. Ibid.

33. Ibid.

34. Ibid.

35. ESC, *General Concepts of Engineer Barrier and Denial Planning*, no. 22 (Sept. 1958). Hereafter ESC studies will be cited using this format. The number refers to the number in the ESC *Bibliography of Publications* and the date is the date of publication. Subsequent references to a study will use a shortened form of the title.

36. Ibid.

37. Ibid.

38. Interview with Mr. Bockting.

39. Interview with Gen. Rebh.

40. Ibid.

41. Although the final published versions of these barrier studies are not available, some manuscripts and rough drafts of studies for these areas can be found in the file Headquarters, Strategic Planning Group, AMS, USACE, Records of U.S. Army Major Commands, RG 338, NPRC, St. Louis, MO.

42. Interview with Gen. Rebh.

43. Ibid.

44. ESC, *General Concepts of Engineer Barrier and Denial Planning.*

45. Interview with Gen. Rebh.

46. Ibid.

47. Ibid.